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The Impact of Agricultural Growth on Poverty - A Review of Literature

by

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THE IMPACT OF AGRICULTURAL GROWTH ON POVERTY - A REVIEW OF LITERATURE

V. Chandrasekara Naidu

Background to the Review :

1The concern to improve the living conditions of the weaker sections through agricultural development has been there right from the beginning of the first five year plan. Some of the major programmes which had been implemented rather vigorously in this direction in 1950s were land reforms, community development, agricultural extension and co-operatives.[1] But these community based approaches to agricultural development could not help to increase the food production required for the growing population in the sixties. Hence it resulted in the occurence of famines in some parts of the country like Bihar and in large scale imports of foodgrains in mid-sixties. All these forced the government to launch productivity improving programmes like HYV technologies in agriculture towards the end of the sixties.[2] These programmes, which have subsequently come to be known as the 'green revolution' were initially taken up in the well resource endowed regions and by the well to do farmers (mostly the large farmers) in the rural areas. Thus, the community based approach to agricultural development was given up in favour of a selective approach to agricultural development in the sixties. But the selective approach to agricultural development had restricted the implementation of certain radical programmes like land reforms which were primarily designed to benefit the poor. And in the process the government only strengthened those institutions (like skewed distribution

of land ownership) which it earlier wanted to destroy for the benefit of the poor. Thus, the green revolution was introduced primarily as a techno-economic solution to the problem of food rather than as a socio-economic solution to the problem of poverty. But the government expected the green revolution to benefit the poor indirectly by generating more of employment and incomes in their hands.[3] But although the green revolution was on its expansionary phase by mid-seventies covering more regions, crops and groups of farmers, the mass poverty did not show any significant decline. At the end of the seventies around 50 per cent of the total rural population was seen to be below the poverty line. And this only gave rise to doubts about the beneficial effects of green revolution or agricultural growth on the poor in the existing socio-economic and institutional conditions.[4] In toto, the changes in approaches to agricultural growth during the last 3 decades (1950 to 1980) from community participation to selective participation in agricultural growth had not resulted in any significant declines in poverty and at best they could have only averted any possible significant increases in it over the years.

In addition to the above indirect approaches to Poverty alleviation through agricultural growth, some of our five year plans have also made their attempts to directly link these two over the years. The direct approach can be traced even to the very first document prepared by the Perspective Planning Division (PPD). This document, which was prepared in 1962 proposed 7 per cent rate of growth of the economy as a necessary condition to alleviate mass poverty at least by mid-seventies.[5] But the circumstances like Indo-Pakistan war, suspension of five

year plans and the prevalence of famine conditions etc in the sixties put the implementation of PPD document's proposals into cold storage till the beginning of fifth five year plan in 1974. But this document provided the cornerstone for the fifth five year plan's approaches and calculations to solve the problem of poverty. Hence, among all the plans, the fifth plan became the first one to aim at reducing poverty by an accelerated rate of growth of the economy which was put at around 5.5 per cent (compared to the 3.7 per cent rate of growth of the economy achieved in the earlier two decades of planning) in combination with the other income redistributing programmes.[6] As part of its income redistribution effort, the fifth plan wanted to transfer a part of the incomes from the top 30 per cent of the population to the bottom 30 per cent of the population so that the latter's share in the total consumption could go up from 13 per cent to 18 per cent within a period of a decade. Some other beneficiary programmes for the poor which the plan wanted to implement were the (a) employment guarantee scheme (EGS) for the landless, (b) credit schemes for the small and marginal farmers, (c) area schemes like the Drought Prone Area Programme (DPAP), (d) national minimum needs programme and (e) supply of essential consumer items at reasonable price levels etc. Thus, the fifth plan adopted a 'growth plus' approach to the problem of poverty. As for as the 'agricultural growth' specifically benefitting the poor is concerned, it expected the implementation of credit schemes by the small and marginal farmers and agricultural labourers development agencies (SFDA and MFAL) and the Drought Prone Area Programmes (DPAP) and the introduction of new technologies **can not** only increase the total output of agriculture but also increase the shares obtained from

it by the small-owner cultivators, tenants and landless labourers etc. Thus, the fifth plan wanted to eradicate poverty within a period of a decade not only by increasing the rate of growth of the economy but also by ensuring the weaker sections to obtain a larger share of such increased incomes especially through the transfer (of incomes from the top to bottom) and other agricultural programmes.

Contrary to the fifth plan's approaches of alleviating poverty through a higher rate of growth of the economy and redistributional programmes the sixth plan doubted the feasibility of achieving a higher rate of growth of the economy required to reduce poverty within the short run.[7] Hence, it wanted to strengthen the redistributive bias of the programmes such as the (a) Integrated Rural Development Programme (IRDP), National Rural Employment Programme (NREP) and Rural Labour Employment Gurantee Programmes (RLEGP) and Drought and Desert Area Programmes (DPAP and DDP) etc. In the implementation of these programmes, the sixth plan aimed at specifically raising the incomes of those households who were below the poverty line. Anyhow, it expected these target and area - oriented programmes to lift the poor households above the poverty line only in the short run and in the long run it depended on a 'higher rate of growth' of the economy and its agricultural sector to provide an effective solution to the problem of poverty.

The seventh plan also recognised the inability of the economy to achieve a higher rate of growth in the short run and wanted to integrate some of the major beneficiary programmes like IRDP, NREP and RLEGP with the area (DPAP, DDP and hill areas development) and sectoral

programmes (like agriculture and industry) for the alleviation of poverty in the medium term. But these integrated target and area-oriented programmes are again expected to reinforce the efforts of agricultural growth at reducing poverty effectively in the long run.[8]

Thus, despite dependence on 'growth plus' approaches to the problem of poverty in the short run, in the long run, the plans have envisaged that it is only 'growth' which can provide a lasting solution to the problem of mass poverty. And from mid-seventies onwards the agricultural growth was re-conceived even as a socio-economic solution to the problem of poverty rather than as a mere techno-economic solution to the problem of food. And this approach has been adopted without much of changes in the prevailing socio-economic, structural (like the skewed distribution of land ownership) and institutional (like terms of tenancy etc) conditions.

The relationship between agricultural output growth and poverty has become a major theme of academic debates. The literature in this area can be broadly divided into : (a) the earlier studies conducted till about mid-seventies, especially by Pranab Bardhan (1971), Deepak Lal (1976), Indira Rajaraman (1975), Rohini Nayar (1977) and C.T.Kurien (1977); (b) the recent studies conducted after mid-seventies, especially by Ahluwalia (1978 and 1986), Keith Griffin and A.K.Ghose (1979), Ashwani Saith (1981) and Pranab Bardhan (1986). In this paper, we set out to review only the recent studies mainly because of the superiority of their analyses over the earlier ones. For instance , (1) while the earlier studies have analysed the changes in the levels of poverty either between the two terminal

years or for a few years in the sixties, the recent studies have analysed both the changes in the levels of poverty and the trends in it over a fairly long period of time from 1956-57 to 1977-78. (2) Since the earlier studies ended their analyses with the year of 1970-71, they could not capture even the full impact of green revolution on poverty which hardly started in 1967-68 after severe droughts in the previous two years. On the other hand, the recent studies have analysed the trends in poverty till the latest year of 1977-78 for which the data are available and could capture the impact of green revolution in particular and agricultural growth in general on poverty (3) As far as the analysis of the relationships between agricultural output growth and poverty is concerned the earlier studies could examine only the indirect effects of the former on employment and wage rates of a particular category of poor households viz., agricultural labourers that too in between the two terminal years; the recent studies could analyse the direct impact of agricultural growth on the poverty of all categories of households over a period of time.

Among the recent studies, Ahluwalia's (1978) becomes the first one with which we would like to start the review. Although, some studies have analysed the relationships both at macro and micro levels of the economy, we would like to review them separately mainly for the sake of greater clarity and understanding of the issues involved. Hence the review is divided into three parts viz., (a) all-India level studies (b) state and regional level studies and (c) occupational and household level studies.

PART I

All India Level Studies :

Some of the major studies conducted at an all-India level are those by Ahluwalia (1978 and 1986), Ashwani Saith (1981) and Dharm Narain (summarised by John W.Mellor, 1986). Ahluwalia (1978) tried to test the hypothesis that "agricultural output growth tends to reduce poverty even without any major institutional reforms". At an all-India level, he has made use of the time-series data available for the period from 1956-57 to 1973-74 on consumer expenditures provided by the National Sample Surveys (NSS) and the Net State Domestic Product (NDP) in agriculture per head of rural population at 1960-61 prices provided by the Union Ministry of Agriculture and Irrigation. Then, he has fitted the regression equations (Appendix - I) with the dependent variable of poverty (measured on both the head-count ratio and Sen's index) and the NDP per capita and the 'time term' as explanatory variables. The 'time term' is expected to capture the effects of all other excluded variables in the equations. He also used better measures of poverty and agricultural output growth in the equations. This is because his poverty variables (Head-count ratio and Sen's index) take into account both the extent and the intensity of poverty prevailing in the rural economy and his agricultural output growth variable represents the per capita net value added in agriculture as against the per capita gross value added in agriculture over the years. However, his regression coefficients showed that while one of his explanatory variables viz; the agricultural output growth is significantly negative, the 'time term' is not at all significant. The coefficients on the

explanatory variables remained the same even after allowing for the lagged effects of agricultural growth on poverty. Thus, his analysis, at an all-India level, reveals a clear inverse relationship between agricultural output growth and poverty. In addition, it is also important to note from his analysis that at an all-India level there is no significant 'time term' in poverty operating independently of the effects of agricultural output growth. Ahluwalia (1986) has also extended his analysis by including the data for some more years (1958-59, 1971-72, 1972-73 and 1977-78) in his series till 1977-78. And his extended analysis following the same methods only reaffirmed his earlier conclusions regarding the relationships prevailing between agricultural output growth and poverty. But what is worrying about his all-India result is that his main explanatory variable i.e., NDP in agriculture per capita in real terms had almost stagnated even during the whole period of 1956-57 to 1977-78 at around 2 per cent per annum[9] which was only slightly faster than rural population. There simply was no growth of agricultural output to benefit the rural poor in this period. Then, where does the question of testing the above hypothesis at an all-India level either by Ahluwalia or others arise?

Dharm Narain (1986) has fitted the regression equations with the same type of data provided by Ahluwalia but for a truncated period of 1956-57 to 1970-71. But he has not given any reason for the exclusion of the data for the year 1973-74. One possible reason could be that it is the only observation which inadequately represents the decade of seventies in Ahluwalia's time-series. However, Dharm Narain's main emphasis was to examine the effects of price levels on poverty along with the agricultural output

growth. He has fitted the regression equations (Appendix - II) with the proportion of rural population living in poverty as the dependent variable and the Net State Domestic Product in agriculture per rural person (NDPARP) as one of the explanatory variables along with the 'time term' and different price variables (Consumer Price Index for Agricultural Labourers (CPIAL) and the Index Number of wholesale price of foodgrains (IFGP)). He has also allowed for the lagged effects of agricultural production on poverty by taking the average of NDPARP in the current and in the previous year. But like Ahluwalia he did not run another set of regression equations with the better measure of poverty (Sen's Index) as the dependent variable. And this should have been done to examine whether the regression coefficients differ substantially with the change in the dependent variable of poverty.

Dharm Narain's results while supporting Ahluwalia's result on the relationship prevailing between agricultural growth and poverty also found that the higher price levels had a more significant positive effect on poverty. In fact, his results showed that higher price levels even in comparison to agricultural output growth explain a larger proportion of the variation in the dependent variable of poverty.

But, where Dharm Narain's results differed seriously with that of Ahluwalia's was at the coefficient obtained on the 'catch all' variable of 'time term' which showed it to be significantly negative with poverty. To put it in other words, while Ahluwalia reported no underlying time trend in poverty in his period from 1956-57 to 1973-74; Dharm Narain reported declining trend incidence of poverty in his truncated period from 1956-57 to 1970-71 even after netting out the significant opposite effects

of agricultural output growth and price levels on poverty. Some of the factors which could have independently influenced poverty in a negative direction which Dharm Narain had in mind are the growth of tertiary sector, introduction of land reforms and the development of co-operative institutions etc in 1950s. Dharm Narain's analysis also reveals that agricultural output growth by itself cannot reduce the incidence of poverty without the support of lower consumer price levels and the effective implementation of land reforms etc.

Ashwani Seith has analysed the relationships between agricultural output growth and poverty at an all-India level for the truncated period of 1960-61 to 1970-71. He has fitted the regression equations with the proportion of rural population living below the poverty line as the dependent variable and the percentage deviations of the index of agricultural production (IAP) and the CPIAL from their fitted trend values and the 'time term' as the explanatory variables in his equations. But he has not fitted separate regression equations either with a better variable of poverty measured on the Sen's index or allowing for lagged effects of agricultural production on poverty in his chosen period. However, he provides several reasons for the truncation of his period to 1960-61 to 1970-71 by excluding the data for the years in late fifties and in early seventies. And some of the main reasons given are: (1) it is misleading to use single linear trend for the whole period of 1956-57 to 1973-74 (2) consumer expenditure data which are used for poverty estimates are not comparable over the years because of the changes in the NSS reference periods, geographical coverages and the valuation procedures adopted[10] etc and (3) the CPIAL, which

is used to compute the poverty line in various years, exaggerates the extent of the rise in prices in the early seventies because it is based on 1956-57 weights.[11] Hence, he took the period of 1960-61 to 1970-71 as the most appropriate period for his analysis.

Ashwani Saith's results while supporting Ahluwalia's result on the significant negative relationship prevailing between agricultural growth and poverty also supports the Dharm Narain's result on the significant offsetting positive effect of prices on poverty. But Ashwani Saith's result on 'time term' showed it to be significantly positive in his period of 1960-61 to 1970-71 which is just opposite of Dharm Narain's finding relating to the period of 1956-57 to 1970-71. And Ahluwalia reported no significant effect of 'time term' either positive or negative on poverty. Saith's estimates showed that even after netting out the effects of agricultural output growth and price levels on poverty the latter was independently increasing by about one and a half per cent per annum in sixties. He explains this phenomenon mainly in terms of the introduction of new technologies in agriculture which by itself could have unleashed certain growth processes which may be more in the nature of poverty generating rather than poverty alleviating over the years. Some of the growth processes which he could identify were those of the (a) labour displacing technological processes, (b) resumption of land for self cultivation by the bigger and richer farmers from the tenants, and (c) the sharper increases in the administered price levels of the food brought about by the influence of bigger farmers etc. However, one important thing that we should note from Saith's analysis is that at an all-India level there are factors other than agricultural

output growth and consumer price levels which by themselves tend to increase the incidence of poverty over a period of time. He concludes by saying that the very process of agricultural growth may accentuate the incidence of poverty by reinforcing the effects of price levels and other excluded factors in the analysis.

Thus, at an all-India level, where the above studies differed was not at the significant negative effect of agricultural growth or at the significant positive effect of price levels on poverty but at the effects of 'all other factors' which they tried to capture through the dummy variable of 'time term'. In this, the periods chosen for the analysis have made a bigger difference to the directions and the significances of their effects on poverty over a period of time. The three time periods chosen for the analysis by the studies revealed the exactly opposite effects of 'all other factors' on poverty : while Ahluwalia reported no significant relationship with poverty in both the periods of 1956-57 to 1973-74 and 1956-57 to 1977-78, Dharm Narain reported significant positive relationship in the period from 1960-61 to 1970-71. Hence, it is worth examining at a micro level whether these 'all other factors or processes' are unleashed by the very same pattern of agricultural growth adopted in the rural areas. Further, to be more definite about the relationships of agricultural output growth, prices and the 'time term' with poverty, especially, in the periods of 1956-57 to 1970-71 and 1960-61 to 1970-71 there is still need to fit the regression equations with the better dependent variable of poverty measured by the Sen's index and the independent variable of agricultural output measured by its net value added (NDP) rather than by its gross value added (IAP) per capita in

agriculture in the above cited periods chosen especially by Dharm Narain and Ashwani Saith may considerably enhance our understanding of the relationships prevailing between these two at an all-India level. But what is worrying about the analyses of all-India studies is the fact that in their chosen periods there simply was no real growth of agricultural output so as to benefit the poor in any substantial way.[12] Perhaps T.N.Srinivasan may be right in pointing out that there simply was not enough growth for trickle down mechanisms to have a significant trend impact on poverty.[13] Of course, Ahluwalia has admitted (1978 and 1986) that NDP per head of rural population showed no significant trend growth over the years. And during the period from 1956-57 to 1977-78 real agricultural income measured in terms of NDP grew by about only 2 per cent per annum which was only slightly higher than the rate of rural population growth[14]. Further, although some studies have provided some hunches about the increasing or declining incidence of poverty in their chosen periods; they failed to provide an adequate explanation of how and why the changes in poverty are brought about even when there is no significant change in the rates of growth of agricultural outputs in their chosen periods at an all-India level. Now let us examine the other sources of data available on the changes in the economic conditions of one of the major poor groups of households viz., agricultural labourers more or less during the same period from 1956-57 to 1974-75.

The Agricultural/Rural Labour Enquiry Committee Reports provide systematic data on employment, wage rates, incomes and indebtedness of agricultural labourers at an all-India and State levels. But for our purpose here, let

us confine ourselves to the examination of the changes brought about in these aspects only at an all-India level. If agricultural growth had really benefited one of the major groups of poor households viz., agricultural labourers who account for about one-fourth of the total workforce (26.69 per cent in 1970-71 and 24.94 per cent in 1980-81) in rural areas, then this should have resulted in improving their employment opportunities, real wage rates and total household incomes and in declines in their indebtedness and incidence of poverty over the years.

First of all, let us analyse the growth of workforce in rural areas, based on the census data, in 1950s, 1960s and 1970s[15] which also witnessed the changes in agricultural sector. The proportion of cultivators in the total workforce had marginally increased in fifties from 50 to 53.2 per cent; the period of sixties saw a sharp decline by about 10 percentage points from 53.2 to 43.4 in 1970-71 and then the period of seventies saw a marginal decline from 43.4 to 41.58 per cent in 1980-81. This sharp decline in the proportion of cultivators to total workers in the sixties was also accompanied by a sharp increase in the proportion of agricultural labourers by about the same 10 percentage points from 15.5 per cent in 1960-61 to 26.3 per cent in 1970-71. Thus, in contrast to the decade of 1960s which witnessed sharp changes in the proportions of cultivators and agricultural labourers to total workforce; the decades of 1950s and 1970s had witnessed only marginal changes in them. In 1950s the percentage of agricultural labourers declined from 19.7 per cent to 15.5 per cent 1960-61; and in 1970s the same had declined from 26.3 per cent to 24.94 per cent 1981. Thus, these figures show that the period of 1960s,

in particular, had experienced sharp declines in the numbers of cultivators both absolutely and proportionately and a corresponding increase both in the number and the proportion of agricultural labourers in the total workforce in the rural areas. Definitely, all these changes cannot be attributed to demographic factors alone. Part of it can be accounted only by the depeasantisation and proletarianisation processes working in the rural economy of the country.

Now let us see what had happened to the employment opportunities of agricultural labourers in agriculture.[16] The wage paid employment for male agricultural labourers had gone up from 194 days in 1956-57 to 217 in 1964-65 and then declined to 193 by 1974-75. For the females, the number of days of employment had gone up from 131 in 1956-57 to 149 in 1964-65 and then it declined to 138 by 1974-75. Thus, these figures show a sharp reduction in the employment of agricultural labourers even during a period of green revolution. Wage rates paid to male agricultural labourers in real terms had declined (deflated by CPIAL) from Rs.1.43 in 1964-65 to Rs.1.26 in 1974-75 which in turn works out to a 12 per cent decline over the years.

According to the Agricultural/Rural Labour Enquiry Committee Reports, the percentage of agricultural labourer households in debt during the period from 1964-65 to 1974-75 had gone up from 60.6 to 66.4 per cent, compared to the earlier period (1956-57 to 1964-65) which saw a decline from 63.9 to 60.6 per cent. The average indebtedness of these households had been continuously increasing over the years from Rs.138 in 1956-57 to Rs.244 in 1964-65 and then to Rs.584 in 1974-75. The borrowing for consumption purposes had gone up from Rs.130 in 1964-65 to Rs.281 in 1974-75. Thus, these figures show the increased indebtedness

of agricultural labour households over the years. And this increased indebtedness only corresponds to the declining employment and real wage rates for agricultural labourers in the same period from 1964-65 to 1974-75.

Pranab Bardhan (1986) computed the total annual wage incomes of all the earning members of all agricultural labour households based on the scattered information provided by the Rural Labour Enquiry Committee Reports, 1964-65 and 1974-75.[17] His computations showed declines in real annual total wage income of agricultural labour households in almost all the states including the Punjab and Haryana between 1964-65 and 1974-75. For rural India as a whole, it declined by about 16 per cent over the years. He also further calculated the incidence of rural poverty among agricultural labour households based on the data provided by the First Rural Labour Enquiry Committee Report and the NSS 32nd round for the years 1964-65 and 1977-78 respectively. (These sources had provided some information on the distribution of agricultural labour households by expenditure classes). His calculations showed that the proportion of agricultural labour households living below the poverty line in the whole of rural India had increased from 52 per cent in 1963-64 to 56 per cent in 1977-78. Bardhan also reported that during the same period the net domestic product from agriculture at 1960-61 prices increased by about 43 per cent.

Thus, the period of sixties and early seventies which witnessed the introduction of green revolution in agriculture and reaped its after effects had witnessed declines in employment and real wage incomes and the increases in the average indebtedness and incidence of poverty among agricultural labour households over the years. Thus,

the kind of agricultural growth which we had witnessed in sixties and seventies could not even benefit the agricultural labourers who accounted for more than one-third (36.5 per cent) of the total workforce engaged in agriculture. Then, whomelse the agricultural growth of sixties and seventies had benefited in rural India needs to be examined. And this also to some extent contradicts the findings of the studies conducted at an all-India level that there exists significant inverse relationship between agricultural output growth and poverty.

PART II

State and Regional Level Studies :

Since at an all-India level, the rate of growth of agricultural output in real terms per head of rural population had almost been stagnant even over a period of 3 decades; the studies conducted at that level could not capture the effects of different rates and patterns of agricultural growth prevailing at a micro level of states and regions etc on the levels of poverty over a period of time. The all-India level studies could not also take into account the varying socio-economic, production and institutional (like land ownership and tenancy conditions) conditions prevailing at a micro level in their analyses. Thus, the state and the regional level studies conducted could have captured better the different relationships prevailing between different rates and patterns of agricultural growth and poverty in the varying socio-economic, production and institutional conditions prevailing at the more disaggregated levels of the economy. With this sort of an expectation, let us examine the state and regional studies conducted on this aspect.

Some of the major studies conducted at this level are those by Ahluwalia (1978), Keith Griffin and Ghose (1979), Sudipto Mundle (1983), Pranab Bardhan (1983, and 1986). Like the all-India studies, these studies have also tried to test the hypothesis that 'agricultural output growth tends to reduce poverty even without any major institutional reforms".

Ahluwalia fitted the state level regression equations (Appendix - III) with the poverty measured both on the head-count ratio and on the Sen's index as the dependent variables and the Index of Agricultural Production per head of rural population (IAPPH) and the 'time term' as explanatory variables. But unlike his all-India level study, his state level study has fitted the regression equations with the IAPPH variables which is a gross output measure of agricultural growth rather than with the NDP which is a net value added measure of agricultural growth. Further, while he has extended his analysis up to 1977-78 mainly by filling the gaps in his time-series, he has not done the same at the state level where it may be even more crucial for the better understanding of the relationships between agricultural growth and poverty. Hence at the state level, he restricted his analysis to the period of only 1956-57 to 1973-74 rather than to the period of 1956-57 to 1977-78. Of course, even at the state level he allowed for the lagged effects of agricultural production on poverty. But unlike his all-India level study, he came to different conclusions about the relationships prevailing between agricultural output growth and poverty at the state levels. Let us see what they are :

- The trend decline in the rate of growth of agricultural output per head of rural population (RGAOPH) can be associated with the significant trend decline in poverty in a state like Andhra Pradesh.
- The trend decline in the R.G.A.O.P.H. can also be associated with the significant trend increase in poverty in a state like Assam.
- The significant trend increase in R.G.A.O.P.H can be associated with the significant trend increase in poverty in a state like West Bengal.
- The significant trend increases in R.G.A.O.P.H need not be associated with any significant trend declines in poverty in states like Punjab and Haryana, Kerala, Orissa, Tamil Nadu and Uttar Pradesh.
- And the regression equations fitted with the data on these two variables showed that in 7 out of 14 states the R.G.A.O.P.H revealed no significant relationship either positive or negative with poverty over the years.

Thus, the Ahluwalia's state level study could not reach any definite conclusion about the exact relationship prevailing between agricultural output growth and poverty and hence preferred the results obtained by him at an all-India level by pointing out that 'in our view the all-India results should be given substantial weight, if only because of the greater reliability of the data series used, and these results point out to a beneficial impact on absolute poverty from increases in agricultural output per head'. And he accounts for the differences in the results

obtained at the all-India and state levels mainly in terms of (a) the greater variations in the rates of growth of agricultural outputs at the state levels when it (rate of growth) has almost been stagnant at an all-India level even over a period of 3 decades, (b) the state level economies are more open than the economy of all-India which is very much a closed one, and (c) the possible overestimation of his agricultural output growth variable (IAPFH) at the state level compared to the more reliable variable of NDP used at an all-India level. And these limitations which he himself admits make his state level analysis somewhat weaker compared to his all-India analysis. However, while he tried to explain the differences in the results obtained between the all-India and state levels, he did not try to provide an adequate explanation for the differences observed in the results obtained between the states. Hence there is need to explain <u>how</u> and <u>why</u> the significant rates of growth of agricultural outputs achieved in some six states could not lead to any significant trend declines in poverty and in one state (West Bengal) it even led to significant trend increase in poverty over the years. In the same manner, <u>how</u> and <u>why</u> even the trend decline in the rate of growth of agricultural output could lead to significant trend decline in poverty in a state like Andhra Pradesh. And for this kind of an explanation, the above conclusions of Ahluwalia suggest that one has to look even beyond the mere numerical rates of growth of agricultural outputs achieved at an aggregate level over the years mainly in terms of their (rates) associated patterns of agricultural growth and their underlying socio-economic and institutional conditions (like the ownership of land and terms of tenancy) prevailing at a micro level.

Another important difference which we should note from Ahluwalia's analyses done at the all-India and state levels is that where there was only very little growth of agricultural output it showed it to be significantly negatively related with poverty and where there was significant growth of agricultural outputs in some states it showed it to be either significantly positively related with poverty or with the stagnant (neither trend increase nor trend decline) levels of poverty over the years. In other words, while the smaller growth of agricultural output at an all-India level was significantly negatively related with poverty; the higher rates of growth of agricultural outputs achieved in some states are either significantly positively related or in no significant relationship with poverty over the years. And this crucial difference observed in the relationships between agricultural growth and poverty at different levels of the economy was sought to be played down by Ahluwalia by citing the limitations of data and openness of the economies at the state levels. However, one thing which the Ahluwalia's study at the state level makes it clear is that in no state the significant rate of growth of agricultural output achieved led to significant trend decline in poverty over the years. And as he himself puts it 'is clearly disturbing and calls for further investigation' (p. 30).

Keith Griffin and Ajit Kumar Ghose had also examined the state level data provided by Ahluwalia from a different angle. They have excluded the 2 observations relating to the years in 1950s and taken Ahluwalia's data on poverty for the period 1960-61 to 1973-74. The justification given for the truncation of the period by them was that the observations for the 1950s 'tends to obscure the rising

incidence of rural poverty that occurred in many states of India from about 1960s'. But their independent variable of agricultural output growth refers to the whole period of 1956-57 to 1973-74. However, Griffin and Ghose have analysed the relationships between agricultural growth and poverty only through the simple correlations rather than through fitting the data into the regression equations. Unlike Ahluwalia they have used only the head-count ratio of poverty measured for different reference periods as the dependent variable. They have calculated the percentage change in poverty ratio from the average of the years 1960-64 to the average of the years 1970-74 ignoring the years in late sixties which had registered the peak levels of poverty (57.4 per cent in 1966-67 and 57.9 per cent in 1967-68) in the whole of time-series. And the years for which the averages had been worked out by Griffin and Ghose had in fact registered less than 50 per cent of the total rural population living below the poverty line in their chosen periods. And this type of calculations inadequately represents the levels of poverty and the changes in it over the years. But they have taken the trends in the rate of growth of agricultural outputs or foodgrains relating to the period 1956-57 to 1973-74 as another variable for the calculations of correlation coefficients between growth and poverty.

They have also analysed the correlation coefficients between the trend rate of change in poverty over the period 1960-61 to 1973-74 and the trend rate of growth of agricultural output over the period 1956-57 to 1973-74. Thus, they have obtained the correlation coefficients between the short term variable of poverty and the long term variable of agricultural output growth which is quite inappropriate even as a method of analysis. But they have not

provided any justification for choosing different periods for the calculations of their different variables. Further, their agricultural output variable being a gross measure (foodgrain production) can only overestimate it at the state levels. However, they have used the less reliable measures of both poverty (measured only on the head-count ratio rather than on the Sen's index) and agricultural output variables in their equally less reliable statistical method of simple correlations. And with this type of analysis they came to the conclusion that "there is no evidence whatsoever, let alone 'very strong evidence' that agricultural growth tends to reduce the incidence of poverty. The connection between the two is approximately zero".[18] But their conclusion need not surprise us given the type of variables that they have used and the method adopted for the analysis. Perhaps Saith is right in pointing out that "it might not be enough to demonstrate a non-significant positive simple correlation between rural poverty and agricultural growth, since the latter could well co-exist with a significant negative partial correlation between the two variables". Thus, Griffin and Ghose's conclusion of no relationship at all between the two variables at the state level cannot be accepted straightaway because their analyses suffer from some of the above said methodological problems.

Sudipto Mundle tried to examine the relationship between agricultural output growth and poverty in the truncated period of 1963-64 to 1973-74 (i.e., the period beginning just before the introduction of green revolution and extending over the main phase of its spread) at the state level. For this purpose he computed the simple correlation coefficients between the incidence of poverty

(measured on the head-count ratio with a poverty line of 2435 calories per capita per day) and the per capita foodgrain production. His simple correlation coefficients revealed that they are significant and negative in only 6 of the 15 states considered for the analysis and in the rest they are insignificant. But his analysis suffers from some of the following problems : (a) he has not used the better variables of poverty (Sen's index) and agricultural output growth (NDP per capita), (b) if his idea was to capture the effects of green revolution on poverty then he should have eliminated the effects of droughts especially in the years of 1966-67 and 1967-68 in which poverty ratios had hit their peak levels by registering 57.4 per cent and 57.9 per cent respectively, (c) in the main phase of green revolution, excluding the drought years, he had only just 3 observations (for the years of 1968-69, 1970-71 and 1973-74) which are not enough to capture the full impact of green revolution on poverty, and (d) the results of the simple correlation coefficients may be the just opposite of the results obtained by computing the partial correlation coefficients between the two variables. Hence Mundle's conclusions should be taken somewhat cautiously though he may be right in taking the view that agricultural production performance is not a decisive factor underling trends in poverty though it may have an ameliorating effect on poverty.

Pranab Bardhan (1986) also tried to test the relationship between agricultural output growth and poverty at the state level with the help of crosssectional data available for the year 1971-72. In his regression equations (Appendix - IV) he has used the percentage of calorie poor households (with a poverty line of 2160 calories, per

capita per day) as the dependent variable and the value of agricultural production per male worker, Consumer Price Index for Agricultural Labourers (CPIAL) and the concentration ratio of rural asset ownership as the explanatory variables. The regression coefficients showed that while poverty is significantly negatively related with the agricultural output variable, it is significantly positively related with the concentration ratio of rural asset ownership and weakly with the CPIAL. These results according to Bardhan show that "there is less rural poverty in more productive regions but more in areas with unequal distribution of asset ownership and higher consumer prices for the poor". But this type of an analysis may not capture the net effect of all these variables if they happen to work together on poverty in a particular area. After all, the green revolution was initially implemented and expanded mainly in those areas which are more productive and characterised by the unequal distribution of land ownership and other assets in the rural areas. Besides, the use of cross sectional data cannot enable us to capture the dynamic effects of agricultural growth or any other factor such as prices on poverty. Further, this type of data cannot also help us to identify those states in which these factors could have exerted a significant pressure on poverty independently. Again, his agricultural output variable being a gross measure tends to overestimate the same across the states. And, as for as his dependent variable is concerned, he could have used a better measure of poverty i.e., the Sen's index. This could have helped him to examine whether the coefficients and the signs obtained on the explanatory variables remain the same even with the change in the dependent variable. Thus, nothing definite can be concluded about the relationship between agricultural

growth and poverty from his cross sectional study relating to a particular year.

Pranab Bardhan (1983) has also examined the relationship between the two at a more disaggregated level of a region (NSS regions) in the country. This, he has done with the cross sectional data available from NSS and other sources for the year 1972-73. He has fitted the regression equations with the data which almost cover the whole of rural India. In his regression equations he has taken the proportion of rural population living below the poverty line (Rs.15 per capita, per month at 1960-61 prices) in the region in 1972-73 as the dependent variable and the average annual rate of growth of crop output for the period 1962-65 to 1970-73 as one of the explanatory variables along with the proportions of male populations belonging to scheduled castes and scheduled tribes, proportion of sparsely populated villages in the region, proportion of area irrigated and the CPIAL in 1972-73 in the state to which the region belongs. However, his regression coefficient on agricultural output variable showed it to be significantly negative. And while the dependent variable is weakly related with the percentage of area irrigated, rural unemployment rate and the CPIAL; it is positively related with the scheduled castes and tribes populations and sparsely populated villages in the regions. But he has regressed the current variable of poverty on the long term variable of agricultural output which may not be quite appropriate for the analysis. Perhaps T.N.Srinivasan may be right in pointing out that this is the usual problem of deriving time series conclusions from cross sectional data.[19] In the same manner, while his poverty variable represents the region, his explanatory variable of CPIAL represents the state

which may either overstate or understate the price levels prevailing in the region to the extent of differences between the two. Hence, it is no surprise to note from his equations that these two variables (prices and poverty) showed weak relationship between them. It is also important to note in this context that at an all-India level, the CPIAL had showed significant positive relationship with poverty over a period of time. Again, like others even Bardhan's agricultural output variable is only a gross output measure rather than a net output added measure. And because of all these shortcomings in Bardhan's analysis; the interpretation of his results on the relationships prevailing between poverty and agricultural output growth and prices becomes somewhat difficult and cannot be established especially at a regional level.

Now let us also take a look at some of the studies conducted to examine the changes in agricultural production and poverty in some specific states in the sixties. Bardhan (1971) and Indira Rajaraman (1975) on Punjab, Rohini Nayyar (1977) on Uttar Pradesh and Bihar and C.T.Kurien (1977) on Tamil Nadu had all reported the increased incidence of poverty in their respective states despite rapid agricultural transformations brought about in them in the period of sixties. In support of their conclusions they had cited the declining employment opportunities offered and the wage rates paid to the agricultural labourers and others in their respective states. In this connection it is also worth quoting the I.L.Os study on Rural Poverty and Landlessness in Rural Asia which also examined the reports of the four Indian states cited above that 'in the 7 South Asian Countries, the increase in poverty has been associated not with a fall but with a rise in cereal production

per head, the main component of the diet of the poor.'[20] This view is also shared by C.T.Kurien in his study of "poverty in Tamil Nadu" where he states that 'a phenomenal increase in output of practically all produce in the rural areas, in particular foodgrains, has left a vast proportion of the population even without nutritionally adequate diet, not to speak of any tolerable level of living."[21]

Thus, the state and the regional level studies conducted did not even indicate the possibility of significant rates of growth of agricultural outputs leading to any significant trend declines in poverty over a period of time. In fact, Kurien had already pointed out that "growth" represented by merely a number could be a very misleading indicator of what was happening in an economy. The studies suggest that factors other than agricultural growth may be far more important in influencing poverty over a period of time. However, it is possible that even while there is no decline in poverty at a macro level the poverty of different occupational groups might have moved in opposite directions at a micro level over the years. Hence, let us examine in the next part the issue of whether the significant rates of growth of agricultural outputs achieved in some states led to any significant declines in the poverty of some occupational groups of households such as small cultivators and agricultural labourers in the rural areas over the years.

PART III

Occupational and Household Level Studies :

Pranab Bardhan (1986) and Deepak Lal (1976) have specifically tested the hypothesis that 'agricultural output growth tends to reduce the incidence of poverty of

landless labour households'. Bardhan has fitted the regression equations (Appendix - V) with the help of cross-sectional data available for 55 regions in the country for the year 1970-71. He has taken the monthly per capita consumption expenditure (MPCE) of non-cultivating wage earner households (at 1960-61 prices) in real terms (provided by the NSS 25th round) as the dependent variable and the average annual rate of growth of crop output (the simple average of the district level data on annual compound growth rate of output of 19 major crops over the period of 1962-65 to 1970-73) as one of the explanatory variables along with the normal rainfall in the region, percentage of area irrigated and different types of irrigation, percentage of large farmer households to total rural households, density of population per sq. kilometre; proportions of male populations belonging to scheduled castes and tribes in the regions and the proportion of working population in the region in manufacturing, repair and services. His regression results showed that the variable on agricultural output is very significantly (0.1 per cent level) and positively related with the MPCE of non-cultivating wage earner households (N.C.W.E.H.H) in the rural areas. However, as has already been pointed out that Bardhan is trying to infer the dynamic effects of agricultural growth on the static phenomenon of poverty with the help of the cross sectional data available from NSS. This is also because his agricultural variable which represents the period 1962-65 to 1970-73 may be influenced by the terminal years chosen by him and it is only either the current or the previous years outputs which could influence the current levels of poverty. Besides, his agricultural variable being a gross measure can only overestimate the net value added per capita in agriculture. The

all-India data which have already been cited regarding the economic conditions of agricultural labour households (A.L.H.Hs) from various sources do not support his conclusion of increased crop output exerting a significant positive pressure on the M.P.C.E. of N.C.W.E.H.Hs in the country. Again, the analysis of crosssectional data cannot enable us to find out the dynamic effects of agricultural growth on the poverty of landless labour households in some specific regions of the country.

Pranab Bardhan (1986) has also analysed the district level data on agricultural output growth and poverty for rural West Bengal for the recent year of 1977-78 from the NSS 32nd round. He fitted the regression equations with the MPCE (at 1960-61 prices) of agricultural labour households as the dependent variable and the rate of growth of crop production in the district over a period of 18 years (1960-61 to 1977-78) as one of the major explanatory variables along with some others in the equations. Contrary to the results of his regional level study, his district level study showed that the agricultural output growth in the districts is significantly negatively associated with the MPCE of agricultural labour households. Thus, Bardhan's analysis at the district level reveals that agricultural output growth need not necessarily benefit the landless labour households in some states like West Bengal. Further, his logit and Ordinary Least Squares (O.L.S.) analysis of the household data (provided by the NSS 32nd round for the year 1977-78) revealed significant positive relationship (Appendices - VI & VII) between the district level rate of growth of agricultural output and the probability of both agricultural labour and small cultivator households sliding below the poverty line. But he analysed the

relationships between the aggregate rates of growth of agricultural outputs achieved at the district level and the poverty brought about at the disaggregated level of households which is quite inappropriate even as a method analysis. And the analysis could have been more appropriately done by examining the relationships between the village level rates of growth of agricultural outputs (to which the households belong) and the poverty of households. This is mainly because of the fact that the village level rates of growth may be much different from the district level rates of growth in agriculture. However, his analysis again contradicts his finding of significant positive relationship prevailing between agricultural output growth and M.P.C.E. of N.C.W.E.H.Hs at the regional level which covered the whole of rural India.

Deepak Lal (1976) has also examined the relationship prevailing between agricultural output increases and the poverty of landless labour households in some six states. Deepak Lal has analysed the data on changes in the proportion of landless labourers living below the poverty line (with three alternative poverty cut off points of Rs.15, Rs.20 and 2250 calories per capita per month at 1960-61 prices) and the changes in the cereal outputs between 1956-57 and 1970-71 through simple correlations. Dropping one observation for the state of Mysore, his simple correlation coefficients showed that the increases in cereal outputs is significantly negatively associated with the poverty of landless labour households over a period of time. He tries to draw all-India inferences based on the analysis of the data only for five states which is quite inappropriate. However, his analysis suffers from some of the data and methodological problems like (a) the consumption data which he has used for the calculations of changes

in poverty are non-comparable especially between 1950s and 1960s. (b) since his analysis was done based on just five observations, any increase in the number of observations is likely to reduce the significances and change the directions of his correlation coefficients, (c) the use of simple correlations is not appropriate for the analysis of the data because of its partial correlation coefficients may turn out to be different, and (d) he made use of the less reliable measures of poverty (head-count ratio instead of Sen's index) and agricultural output growth (gross measure of output rather than net value added measure of output) as variables to compute correlation coefficients. And these limitations make his analysis very vulnerable. Hence, his conclusion of the "alleged incompatibility of agricultural growth and rural poverty redressal within the existing institutional framework of Indian agriculture is not proven" cannot be accepted without serious reservations on the type of data used and the methods of analysis adopted in his study.

Gaiha (1981 and 1984) has analysed the changes in the intensity of poverty of agricultural labour and small cultivator households between 1968-69 and 1970-71 at an all-India level with the panel data provided by the National Council of Applied Economic Research (NCAER). Although, Gaiha has not examined the relationship between agricultural growth and poverty as such his findings assume importance because they could capture the changes in the intensity of poverty of the same households in the green revolution period. His analysis of the NCAER data reveals that between 1968 and 1970, some 12 per cent of all rural sample households who were not poor earlier became poor by 1970; some 22 per cent of those who were poor earlier remained

at the same level, while another 12 per cent of those who were poor earlier became poorer by 1970. His occupational analysis of the data revealed that shift to greater poverty is much more among the agricultural labourers even compared to small cultivators. However, the phenomenon of both poor and non-poor becoming poorer even in the main phase of green revolution is important in itself because it at least indicates that agricultural growth envisaged is unlikely to improve the economic conditions of the weaker sections over the years.

Now let us see some of the small scale intensive household surveys conducted on the poverty of landless labour and small cultivator households in some of the agriculturally advanced districts of Kuttanad (in Kerala) and East Godavari (in Andhra Pradesh) by P.G.K. Panikar (1978) and B. Sarveswara Rao (1980) respectively. Rao has examined the changes in the levels of poverty (taking the poverty line of 2250 calories, per capita per day) of 100 cultivator and 40 agricultural labour households for the years of 1969-70, 1970-71 and 1971-72. His results revealed that while the agriculturally good years tend to reduce the poverty of small cultivators, the same good years tend to accentuate the poverty of landless labourers. On the contrary, while the agriculturally bad years tend to reduce the poverty of landless labourers; the same bad years tend to accentuate the poverty of small cultivators. But this kind of conclusions might have been reached by him because he has not analysed the lagged effects of agricultural production on poverty of these groups even in his short period of study. However, he reported very high levels of povert[illegible]

households in his period which are even higher than the averages (around 62 per cent of total rural population living below the poverty line in the state) obtained at the state level in this period. And his analysis shows that the intensive agricultural districts like East Godavari is no exception for the continued high levels of poverty prevailing among small cultivator and agricultural labour households in the country.

P.G.K. Panikar (1978) had examined the employment, income and food intake among the selected agricultural labour households in the district of Kuttanad which is an agriculturally prosperous area in the state of Kerala. He has conducted two rounds of enquiries with the same households. And his results revealed that the average intake of energy in the sample households worked out to only 66 per cent of the requisite minimum of 2200 calories per capita per day as per the first round of the enquiry and to 54 per cent as per the second enquiry. Since both were conducted in the same year of 1976-77, he should have eliminated for the seasonal biases if any in the food intakes of agriculture labourers which he had not done. Anyhow, his analysis shows very acute poverty prevailing among agricultural labourers who live in an agriculturally prosperous district of Kuttanad. And Panikar may be right in concluding that "the incidence of under nutrition and malnutrition is a reflection of the very low level of income which in turn is due to the inadequate employment opportunities. That such acute poverty and starvation shoud prevail in a region which has been the forefront of new agricultural technology is significant".

Thus, both Rao's and Panikar's studies indicate that faster rates of agricultural growth achieved in some districts need not necessarily lead to any significant declines in poverty of small cultivator and agricultural labour households over the years. Both of them have speculated that the influx of in-migrant labourers and the investments of agricultural surpluses in the urban areas especially by the bigger and richer farmers etc are more in the nature of poverty generating rather than poverty alleviating for some socio-economic groups in the rural areas.

Conclusions and Suggestions :

Thus, the review of studies show that (1) they came to no definite conclusions about the exact relationship prevailing between agricultural growth and poverty but differed depending on the (a) periods chosen, (b) level of aggregation at which a particular study has been carried on, (c) type of data (time-series or cross sectional) and (d) methods (like the use of multiple regressions or simple correlations) of analysis adopted etc. (2) Most of the studies have examined the relationships prevailing only in between the mere numerical rates of growth and poverty without taking into account their (rates) associated patterns of growth and their underlying socio-economic and institutional conditions (like the ownership of land and the terms of tenancy etc) prevailing in the rural economy. (3) Further, the studies conducted in this area have not tried to provide any explanation on how and why agricultural growth benefits the poor in some areas and not in others. For example, while the trend decline (for details, see Ahluwalia, 1978) in the rate of growth of agricultural output had been

associated with the significant trend decline in poverty in a state like Andhra Pradesh; the significant trend increase registered in the rate of growth of agricultural output in West Bengal had also been associated with the significant trend increase in poverty over the years.
(4) The concern of most of the studies has been to examine only the changes in the levels of poverty (measured by the head-count ratio) and trends in it over the years rather than the examination of the changes brought about in the intensity of poverty (Sen's index) of those who are already below the poverty line. In the same manner, the issue of whether those who are just above the poverty line in some years could sustain or not in their economic positions even in the long run went out of examination. However, the examination of the changes brought about in the economic conditions of different socio-economic groups consequent to agricultural growth was even beyond the scope of the studies conducted in this area as Ahluwalia (1978) admits :

"....... A complete exploration of the impact of these factors on the economic condition of different socio-economic groups in the rural economy is obviously beyond the scope of this paper".[22] And this has also been the same even with the subsequent studies.

Hence, the review of literature in this area reveals that the identification and the examination of the effects of different processes unleashed by different rates (lower or higher) and patterns (modern or traditional) of agricultural growth on the economic conditions of the weaker sections under different socio-economic and institutional conditions remains a major gap yet to be explored. Let us

now trace some of these growth processes in two different types of agro-economic villages in which one is supposed to have achieved a higher rate of growth based on the modern pattern (adoption of new seed-water-technologies) of cultivation and the other is supposed to have achieved a lower rate of growth based on the traditional pattern of cultivation (raising of traditional variety of crops based on traditional techniques of cultivation).

Some Aspects of the Modern Growth Processes having a Positive Impact on the Weaker Sections may be the Following:

(1) The increased intensity of HYV cropping leading to the increased employment, wage rates and incomes earned from agriculture to the small farmers, tenants and agricultural labourers. (2) The all round increases in the cash incomes earned from agriculture leading to the increased (a) non-agricultural activities, (b) demand for both rural and urban produced goods and services, (c) utilisation of common and public property resources, (d) values of both productive and unproductive assets owned etc. (3) The increased demand either for permanent or for semi-permanent labourers leading to the encouragement of small tenancy either at low rents or at free of rents.

Some Aspects of Modern Growth Processes having a Negative Impact on the Weaker Sections may be the Following :

(1) The higher incomes earned by the bigger farmers consequent to the introduction of new technologies in their farms leading to their (a) increased purchases of land and other productive assets from the poor (H.Hs), (b) evictions of erstwhile tenants, (c) restrictions of

accessibility to the poor H.Hs to the common and public property resources (d) appropriation of communal assets like ground water, (e) domination in the land, labour, product, credit and rent markets, (f) shift in their demand pattern from rural to urabn produced goods and services, (g) declining practices of their traditional economic customs, (h) neglect of maintenance of communal assets like tanks and canals etc. (2) The increased mechanisation of agriculture leading to the substitution of human and bullock labour (3) The increased intensity of cropping leading to the influx of in-migrant labourers. (4) The increased purchases of lands and the evictions of erstwhile tenants by the bigger farmers leading to the crowding of labour market. (5) The cultivation of HYV crops leading to the increased costs of cultivation and indebtedness to the small peasants and tenants (6) The all round increases in the cash incomes earned from agriculture leading to the faster increases in the price levels of consumer goods and services over the years.

<u>Some Aspects of Traditional Growth Processes having a Positive Impact on the Weaker Sections may be the following</u> :

(1) The low profitability of agriculture even to the bigger farmers consequent to the adoption of traditional technologies in agriculture leading to their (a) declining purchases of land and other productive assets from others, (b) continuation of erstwhile tenants, (c) ineffective domination in the land, labour, product, credit and rent markets, (d) continuation of their demand pattern for rural produced goods and services, (e) enabling of the poor H.Hs to increase their accessibility to the common and public property resources, (f) better maintenance of

communal assets like tanks and canals etc, (2) The low level of cash incomes generated in agriculture leading to the higher proportion of payments made in kind rather than in cash. (3) The adoption of traditional pattern of cultivation leading to the increased demand both for human and bullock labour. (4) The low intensity of cropping leading to the restriction of in-migrant labourers into agriculture. (5) The cultivation of traditional crops leading to the softioning of demographic pressure on land or to the de-crowding of the labour market. (6) The all round low level of cash incomes generated in agriculture leading to the slow increases in the price levels of consumer goods and services over the years.

Some Aspects of the Traditional Growth Processes having a Negative Impact on the Weaker Sections may be the following:

(1) The all round low level of cash incomes generated in agriculture consequent to the cultivation of traditional crops leading to the declines in the (a) non-agricultural occupations, (b) demand for rural produced goods and services, (c) efficient utilisation of common and public property resources, (d) values of both productive and unproductive assets owned etc. (2) The less intensity of cropping that too of traditional varieties leading to the reductions in the average employment offered and the wage rates paid to the persons in the growing labour force in agriculture.

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APPENDIX - I

Ahluwalia, 1978

INCIDENCE OF POVERTY AND AGRICULTURAL GROWTH

Dependent Variable: Estimated Coefficients on Independent Variables (terms in parentheses are t ratios)

Alternative Poverty Measures	Constant	NDPARP	Average of Current & Previous Year NDPARP	Time	R^2	
1) Percentage of Poor: Estimate I						
a	106.524 (5.30)	-0.337** (2.89)	-0.		.43	8
b	132.953 (5.53)		-0.492** (3.52)		.53	12
c	132.808 (4.63)		-0.491** (3.05)	-0.003 (0.01)	.53	5
2) Percentage of poor: Estimate II						
a	96.302 (5.40)	-0.269** (2.59)			.40	6
b	126.390 (6.70)		-0.447** (4.04)		.62	16
c	127.24 (5.80)		-0.451** (3.64)	0.021 (0.09)	.62	7
3) Sen's Poverty Index						
a	0.540 (4.48)	-0.0020** (2.90)			.43	8
b	0.681 (4.55)		-0.0029** (3.27)		.49	10
c	0.753 (4.37)		-0.0032** (3.31)	-0.0016 (0.87)	.53	5

** Indicates that the coefficient is significantly different from zero with the sign shown at the 5% level for a two-tail test.

APPENDIX - II

Dharm Narain, 1986

The equations Estimated by Dharm Narain are the following:

PoV = 45.59 + 0.393 TIME ------ (1.1)
(13.73) (1.04) $R^2 = 0.09$

PoV = the percentage of the rural population in poverty

PoV = 106.524 - 0.337 NDPARP** ------ (1.2)
(5.30) (2.89) $R^2 = 0.43$

PoV = 132.953 - 0.492 ANDPARP**
(5.53) (3.52) $R^2 = 0.53$

NDPARP = Net Domestic Product in Agriculture per head of Rural Population

ANDPARP = Average Value of NDPARP in t and t-1 years

PoV = 132.808 - 0.491 ANDPARP** ---- 0.003 TIME ---- (1.3)
(3.05) (0.01) $R^2 = 0.53$

LPoV = 4.592 - 0.631 LNDPARP* ------ (1.4)
(-3.595)
+0.582 LCPIAL+ - 0.174 LTIME*
(8.537) (-7.353) $R^2 = 0.93$

LPoV = 6.072 - 0.841 LNDPARP* ------ (1.5)
(-4.837)
+0.499 LIFGP* - 0.025 LTIME
(8.022) (-7.029) $R^2 = 0.91$

CPIAL = Consumer Price Index for Agricultural Labourers

IFGP = Index Number of Wholesale Price of Foodgrains

He estimated the above equations after logarithmic transformation of the variables.

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* Figures in parentheses below regression coefficients in equations 1.1 to 1.5 are t ratios. Two asterisks (**) indicate that the regression coefficient is significantly different from zero at the 5 per cent level; a single asterisk (*) indicates that it is significantly different from zero at the 1 per cent level.

APPENDIX - III

Ahluwalia, 1978

Rural Poverty and Agricultural Growth by States

(Terms in parentheses are t ratios)

	Percentage of Rural Population in Poverty as Dependent Variable				Sen's Poverty Index as Dependent Variable			
	Constant	Average of Current and Previous year IAPPH	Time	R^2	Constant	Average of Current and Previous year IAPPH ($x10^{-2}$)	Time ($x10^{-2}$)	R^2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Andhra Pradesh	96.38 (5.58)	-0.479** (2.62)	-0.607** (3.86)	.74	.46 (3.36)	-0.26** (1.87)	-0.37** (3.04)	.63
Assam	-2.05 (0.02)	0.25 (0.28)	1.358** (1.96)	.38	-.04 (0.12)	0.09 (0.26)	0.44 (1.61)	.29
Bihar	95.82 (8.58)	-0.42** (4.47)	1.286** (3.44)	.78	.64 (7.57)	-0.40** (5.54)	0.91** (3.21)	.82
Gujarat	35.71 (1.59)	-0.00 (0.02)	0.956 (1.50)	.27	.23 (2.08)	-0.08 (0.99)	0.57* (1.82)	.33
Karnataka	86.90 (3.31)	-0.474* (1.87)	1.716** (3.07)	.56	.52 (3.39)	-0.37** (2.51)	0.96** (2.95)	.59
Kerala	83.70 (1.35)	-0.298 (0.46)	0.829 (1.37)	.22	.33 (0.78)	-0.09 (0.20)	0.41 (0.98)	.14
Madhya Pradesh	88.72 (18.83)	-0.454** (2.45)	-0.052 (0.09)	.51	.49 (3.66)	-0.31** (2.38)	-0.20 (0.52)	.45
Maharashtra	114.25 (4.16)	-0.548** (2.40)	-0.818 (1.16)	.48	.60 (3.62)	-0.35** (2.55)	-0.59 (1.39)	.50

(Contd. ...)

Appendix - III Contd. ...

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Orissa	76.41 (6.43)	-0.167 (1.53)	1.063* (1.86)	.31	.39 (4.53)	-0.12 (1.48)	0.54 (1.30)	.22
Punjab & Haryana	38.74 (4.09)	-0.175 (1.62)	0.811 (1.76)	.29	.14 (2.76)	-0.06 (1.21)	0.22 (0.91)	.15
Rajasthan	21.34 (2.00)	0.079 (0.70)	0.710** (2.76)	.53	.05 (0.66)	0.05 (0.54)	0.85 (1.78)	.33
Tamil Nadu	165.68 (5.52)	-1.050** (3.52)	0.577 (1.61)	.62	.94 (4.62)	-0.64** (3.18)	0.03 (0.11)	.69
Uttar Pradesh	123.64 (7.03)	-0.864** (4.71)	1.674** (3.75)	.75	.63 (7.14)	-0.49** (5.36)	0.80** (3.56)	.79
West Bengal	110.94 (2.46)	-0.631 (1.37)	1.966** (2.77)	.49	.67 (2.42)	-0.50 (1.79)	1.33** (3.09)	.55

* Indicates coefficient is significant at the 10 per cent level for a two-tail test

** Indicates coefficient is significant at the 5 per cent level for a two-tail test

APPENDIX - IV

Pranab K Bardhan, 1986

Linear Regression Analysis of Determinants of the Percentage of Calorie - Poor Households in 16 States in Rural India, 1971-72.

Explanatory Variable	Regression Coefficient	Standard Error	Significant at Percentage level
1. Value of annual agricultural production per male agricultural worker in Rs. averaged over 1970-73 (OPL)	-0.0113	0.0039	1.4 %
2. Consumer price index of agricultural labourers in 1971-72, with 1960-61 as base (ACPI)	0.3489	0.2374	17.0
3. Concentration ratio of assets owned by rural households on 30 June, 1971 (CONCASS)	168.7547	68.4289	3.1
Constant term	-106.1175	67.6018	14.5

Note : $R^2 = 0.5357$; $F = 4.2$; Number of observations = 15, dependent variable = percentage of rural households consuming below a calorie norm of 2,160 calories per capita per day on an average in 1971-72 (CALPOOR); mean (CALPOOR) = 49.13 per cent; Standard Deviation = 15.47 per cent.

APPENDIX - V

Pranab K Bardhan, 1986

Linear Regression Analysis of Determinants of Per Capita Monthly Expenditure (at 1960-61 Prices) of Non-cultivating-Wage-Earner Households in 55 Regions in Rural India, 1970-71

Explanatory Variable (1)	Regression Coefficient (2)	Standard Error (3)	Significant at Percentage Level (4)
1. Annual normal rainfall in the region in meters (NRAIN)	2.0369	0.7005	0.6%
2. Proportion of area irrigated (IRRP)	0.1058	0.0365	0.6
3. Area irrigated from wells as a proportion of total area irrigated (WELLIRR)	0.0442	0.0187	2.3
4. Average annual rate of growth of agricultural output (GROWTH)	0.4896	0.1436	0.1
5. Electric pump sets and oil engines used per hectare of cropped area (PUMHA)	-18.4191	10.9018	9.8
6. Large-farmer households as a proportion of total rural households (LFARMP)	- 0.0921	0.0440	4.2
7. Density of population per square kilometer (DENS)	-- 0.0207	0.0041	0.0
8. Proportion of (male) population belonging to scheduled castes (MSCHTRIBE)	- 0.1045	0.0567	7.2

(Contd. ...)

Appendix - V Contd. ...

(1)	(2)	(3)	(4)
9. Proportion of (male) population belonging to scheduled tribes (MSCHTRIBE)	-0.1051	0.0290	0.1
10. Proportion of working population in the region in manufacturing, repairing, and services (MFGP)	0.1111	0.0864	20.5
Constant term	15.7150	1.9398	0.0

Note : R^2 = 0.6207; F = 7.2; number of observations = 55; mean (EXPWR) = Rs.14.34; standard deviation = Rs.3.68. The dependent variable (EXPWR) is taken from Government of India, Department of Statistics, National Sample Survey Organisation (n.d.), for each region, and the deflator is the agricultural-labor consumer price index for the state where the region is located. The region-level estimates for NRAIN and WELLIRR were worked out after taking simple averages of district-level data in Government of India, All States (1970-71). IRRP for each region is the area of owned irrigated land as a percentage of total owned land as of 30 June 1971, as reported in Reserve Bank of India (1972). From the same source I have taken LFARMP, the proportion of total rural households operating land above 7.5 acres. The region-level estimate of GROWTH has been computed after taking simple averages o of district-level data on the annual compound growth rate of output of 19 major crops over the period 1962-65 to 1970-73, as given in Bhalla and Alagh (1979). PUMHA has been estimated by taking the data on electric pumps and oil engines from Government of India, Ministry of Food and Agriculture (1971) and using the Bhalla-Alagh estimates of area under 19 crops in each region. The data for DENS, MSCHCASTE, MSCHTRIBE, and MFGP are all from Government of India, Registrar General (1971).

APPENDIX - VI

Pranab K Bardhan, 1986

Table : Logit Analysis of the Probability of a Primarily-Cultivator Households' Falling below the Poverty Line in Rural West Bengal, 1977-78.

Explanatory Variable	Estimated Coefficient	Standard Error
1.CULTIVAT*	-0.3745	0.0406
2.(CULTIVAT) 2*	0.0072	0.0018
3.Percentage of household cultivated and irrigated (IRRCULT)	-0.1889	0.1774
4.NDEP*	0.2306	0.0248
5.EDM*	-0.6629	0.0950
6.NFM	-0.4303	0.2266
7.DIST*	0.0118	0.0033
8.Proportion of total cultivated area in the village irrigated by water from canals and tube wells (CTIRRP)*	-0.6456	0.2373
9.Dummy for October-December quarter (SBRND2)	-0.0903	0.1485
10.Dummy for April-June quarter(SBRND4)	0.2233	0.1510
11.SCHCASTE*	0.7687	0.1304
12.Dummy for household belonging to Scheduled Tribe (SCHTRIBE)*	0.7246	0.2404
13.Population size of village in thousands (VPOP)	0.0211	0.0113
14.RAIN*	-0.1720	0.0791
15.NHA*	-0.0566	0.0073
16.GROWTH*	0.4113	0.0879

Note : Likielihood ratio index=0.2290; number of observations= 2,041. Apart from the variables already introduced in table 8.2, the new variables are IRRCULT, SCHTRIBE, SBRND2, SBRND4, VPOP, and CTIRRP; of these the first four are derived from Government of India, Department of Statistics, National Sample Survey Organisation (1981b), and the last two from Government of India, Registrar General (1971). Again, the variables marked by an asterisk are significant at less than the 5 per cent level.

APPENDIX - VII

Pranab K.Bardhan, 1986

Table :

Logit Analysis of the Probability of an Agricultural-Labour Household's Falling below the Poverty Line in Rural West Bengal, 1977-78.

Explanatory Variable (1)	Estimated Coefficient (2)	Standard Error (3)
1. Area cultivated by the household in acres (CULTIVAT)*	-0.6094	0.1113
2. Number of dependents in the household (NDEP)*	0.4005	0.0362
3. Number of men with above primary education level in the 15-60 age group (EDM)*	-0.8066	0.1901
4. Number of men in the household usually occupied in nonfarm work (NFM)*	-0.6549	0.2142
5. Distance of the village from nearest town, in km. (DIST)*	0.0085	0.0034
6. Village irrigation level (VILIRR)*q	-0.1669	0.0565
7. Average daily wage rate in Rs. for male agricultural labor in the village in the reference week (VWAGEM)* b	-0.3041	0.0494
8. Dummy for male wage employment in public works in or near the village (PUBWORKM)	-0.3753	0.2610
9. Dummy for January-March quarter (SBRND3)	0.2727	0.1577
10. Dummy for the household belonging to schedule caste (SCHCASTE)*	0.3073	0.1222
11. Normal annual rainfall in the district where the village is located (RAIN)*	-0.3005	0.0879

(Contd. ...)

Appendix - VII Contd. ...

(1)	(2)	(3)
12. Nitrogenous fertilizer (in kg.) used per hectare of area under foodgrains in the district where the village is located (NHA)*	-0.0485	0.0079
13. Rate of growth in agricultural production in the district where the village is located (GROWTH)*c	0.2804	0.0933

Sources : The data for variables 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are from Government of India, Department of Statistics, National Sample Survey Organisation (1981b). The data for variable 5 are from Government of India, Registrar General (1971). The district-level variables - 11, 12 and 13 - are from various issues of the Statistical Abstract, published by West Bengal, State Statistical Bureau.

Note : The likelihood ratio index was 0.3020; the number of observations was 2,127. The poverty line has been assumed to be given by a monthly per capita expenditure level of Rs.15 at 1960 prices. Finding a suitable deflator to convert the current-prices expenditure data was a problem. As an approximation, I have used the food price index for the bottom expenditure class of households (Rs.1-100 per month per household) for different regional centers, as regularly published by the State Statistical Bureau of West Bengal. I have taken simple averages over the price index figures of different regional centers within a district, and used this district-average price index to deflate the consumption expenditure of a household located in that district.

* All variables marked by an asterisk are significant at a less than the 5 per cent level.

[a]VILIRR represents four levels of irrigation in the village cultivated area : (1) not irrigated at all; (2) a positive percentage but not more than 10 per cent; (3) 10-25 per cent; and (4) more than 25 per cent.

NOTES

1. For details see the 'Draft First Five Year Plan', Planning Commission, New Delhi 1952.

2. For details on imports and on famines etc. see Biplab Dasgupta (1977) : 'The New Agrarian Technology and India', published by Macmillan Company of India Limited, 1977.

3. This official view was referred to by P.K.Bardhan in his paper on 'Green Revolution and Agricultural Labourers', Economic and Political Weekly, July 1970.

4. This doubt was expressed even in 1971 by Dandekar and Rath in their paper on 'Poverty in India : Dimensions and Trends', Economic and Political Weekly, January 2, 1971. Similar view had also been expressed by Pranab Bardhan in his paper 'On the Incidence of Rural Poverty in the Sixties', Economic and Political Weekly, February 1973.

5. See the paper on 'Perspective of Development : 1961-1976 - Implications of Planning for a Minimum of Level of Living', in T.N.Srinivasan and P.K.Bardhan (Eds) : Poverty and Income Distribution in India, Statistical Publishing Society, Calcutta, 1974.

6. See the 'Draft Fifth Five Year Plan, 1974-79', Vol.I, Government of India, Planning Commission.

7. For details see the 'Sixth Five Year Plan, 1980-85, 'Government of India, Planning Commission.

8. For details see 'The Seventh Five Year Plan, 1985-90', Vol.I, Government of India, Planning Commission.

9. See his own analysis of the data on agricultural output growth between 1956-57 to 1977-78 which was put at

around 2 per cent, per year (in real terms) in his paper "Rural Poverty, Agricultural Production and Prices : A Re-examination", p.70 in John W.Mellor and Gunvant M.Desai (Edited) Agricultural change and Rural Poverty - Variations on a Theme by Dharm Narain, Oxford University Press, 1986.

10. In this connection, he cites A.Vaidyanathan's paper (1974) on "Some Aspects of Inequalities in Living Standards in Rural India", in Poverty and Income Distribution in India, edited by T.N.Srinivasan and P.K.Bardhan.

11. In this connection, he cites D.S.Tyagi's paper (1982) : On "How Valid are the Estimates of Trends in Rural Poverty?" Economic and Political Weekly, Review of Agriculture, June 26, 1982.

12. The "Draft Fifth Five Year Plan, 1974-79" had also admitted the stagnation of agricultural output growth during the first two decades of planning. And also see Montek S.Ahluwalia (1986) : op. cit.

13. This view was expressed by T.N.Srinivasan in his paper (1986) "Agricultural Production, Relative Prices, Entitlements, and Poverty" in John W.Mellor and Gunvant M Desai (Edited) : op. cit. And this was also quoted by S.Ahluwalia in his paper (1986) : op. cit.

14. See Ahluwalia (1986) : op. cit.

15. See Census of India, 1971 and Census of India 1981, Part II B (i), Series-I, Primary Census Abstract, General Population Tables. The 1961 and 1971 figures are reported to have been adjusted to the definitional changes between them.

16. These comparative figures on employment were provided by the "Report of the Second Rural Labour Enquiry Committee, 1974-75".

17. For more information on estimates of income and poverty, see Bardhan's Paper (1986) : On "Poverty and Trickle-down in Rural India" by John W.Mellor and Gunvant M.Desai (edited) : op. cit.

18. See Keith Griffin and Ajit Kumar Ghose (1979) : "Growth and Impoverishment in Rural Areas of Asia", p.372, in World Development, Vo. 7.

19. This view was expressed by T.N.Srinivasan in his paper (1986) : "Agricultural Production, Relative Prices, Entitlements and Poverty" in John W.Mellor and Gunvant M.Desai Edited : op. cit.

20. This conclusion had been reached by the International Labour Organisation (ILO) after reviewing the reports of Seven South Asian Countries which included the reports of 4 Indian States. For details, see its review in Poverty and Landlessness in Rural Asia.

21. See C.T.Kurien (1981) : "Dynamics of Rural Transformation - A Study of Tamil Nadu 1950-1975", p.142, Orient Longman.

22. Montek S.Ahluwalia (1978) : "Rural Poverty in India : 1956-57 to 1973-74", p.24, World Bank Staff Working Paper No.279.

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